

Claims

1. A magnetic storage device of complementary type for storing storage data contrary to each other in a first ferromagnetic tunnel junction element and a second ferromagnetic tunnel junction element, respectively, in which said magnetic storage device using said ferromagnetic tunnel junction elements is characterized in that:

said first ferromagnetic tunnel junction element and said second ferromagnetic tunnel junction element are formed adjacently on a semiconductor substrate;

first writing lines is wound around said first ferromagnetic tunnel junction element like a coil and second writing lines is wound around said second ferromagnetic tunnel junction element like a coil; wherein

a winding direction of said first writing lines and a winding direction of said second writing lines are reversed each other.

2. The magnetic storage device using a ferromagnetic tunnel junction element according to claim 1, characterized in that:

a start-end portion of said second writing lines is connected to a terminal-end portion of said first writing lines to be a sequence of writing lines.

3. The magnetic storage device according to claim 1 or claim 2, characterized in that:

said first writing lines and said second writing lines have parallel wiring portions formed, which are extending in a direction substantially parallel to a magnetization direction of fixed magnetization layers at positions

immediately above or immediately below said first ferromagnetic tunnel junction element and said second ferromagnetic tunnel junction element.

4. The magnetic storage device using a ferromagnetic tunnel junction element according to claim 1 or claim 2, characterized in that:

said first writing lines and said second writing lines have upper and lower writing lines extending in a direction substantially perpendicular to a magnetization direction of said fixed magnetization layers of said first ferromagnetic tunnel junction element and said second ferromagnetic tunnel junction element, at positions above and below said first ferromagnetic tunnel junction element and said second ferromagnetic tunnel junction element; and in addition,

in at least one of said upper and lower writing lines, there are provided parallel wiring portions extending in a direction substantially parallel to a magnetization direction of said fixed magnetization layers at positions immediately above or immediately below said first ferromagnetic tunnel junction element and said second ferromagnetic tunnel junction element.